

BEFORE QUEENSTOWN LAKES DISTRICT COUNCIL

IN THE MATTER of the Resource Management Act 1991

AND Hearing Stream 15: Open Space and Recreation,
Earthworks, Signs, Transport, Visitor Accommodation

**STATEMENT OF EVIDENCE OF HAYDEN ARTHUR KNIGHT
ON BEHALF OF**

Bridesdale Farm Developments Limited (#2391)

S2391 – Bridesdale – T15 – Knight H - Evidence

Dated 26th July 2018

1.0 QUALIFICATIONS AND EXPERIENCE

- 1.1 My name is Hayden Arthur Knight. I hold a Degree of Bachelor of Surveying from Otago University. I am qualified as Licensed Surveyor and a Member of the New Zealand Institute of Surveyors and the Consulting Surveyors of New Zealand.
- 1.2 I have eighteen years' experience as a Surveyor and Land Development Engineer. I have held positions as a Surveyor and Site Engineer in private practice within New Zealand & London, England. I am a partner of Clark Fortune McDonald & Associates Limited.
- 1.3 During this time, I have gained experience in Land Development Engineering in many residential and commercial developments. I have personally been involved with the design and construction of numerous land development projects.
- 1.4 I have read the Code of Conduct for Expert Witnesses in the Environment Court's Consolidated Practice Note (2014) and agree to comply with that code. This evidence is within my area of expertise, except where I state I am relying on what I have been told by another person. I have not omitted to consider material facts known to me that might alter or detract from opinions that I express.

2.0 INFRASTRUCTURE STATEMENT

- 2.1 Clark Fortune McDonald were engaged by Bridesdale Farm Developments Limited (BFDL) to assess services for the proposed Tennis Academy on Lot 404 DP 505513, Hayes Creek Road. This report for the Tennis Academy has been submitted as part of RM180882 and is appended to this statement of evidence.
- 2.2 This assessment determined that the existing infrastructure has capacity and can be extended to service the proposed Tennis Academy (with an expected maximum capacity of 50 people at any one time).
- 2.3 Without knowing the exact nature of any facilities and therefore the servicing demands I cannot determine for certain that the existing infrastructure will have capacity to service the proposed land use. However, from the previous work undertaken for the proposed Tennis Academy, I note that there are servicing options available to connect into the existing Council reticulated services. These are described as follows.
- 2.4 There is an existing 63mm HDPE foul sewer rising main which runs from the existing foul sewer pump station in Red Cottage Drive and terminates in Hayes Creek Road approximately 300m north of the proposed Tennis Academy.

- 2.5 There is an existing 125mm HDPE water main which serves the garden lots to the north of the proposed Tennis Academy. The water main is approximately 250m north of the proposed Tennis Academy and is suitably sized to cater for up to 40 residential allotments.
- 2.6 Stormwater will need to be disposed of on site as the site is very flat and there is very little drainage. Soakage rates to ground are very poor, it is likely that any structures on site will need to be raised above the surrounding ground and detention ponds used to store water from storm event with an ARI of less than 1 in 5 years.
- 2.7 There is existing telecommunications and electrical infrastructure in Hayes Creek Road. Final design will need to be carried out by service providers but it is understood that these networks can be extended.
- 2.8 In summary, there are infrastructure networks available which are likely to be able to service the extent of development which will be reasonably anticipated if the BFDL river flat land is rezoned for sport and recreational activities.

SERVICES REPORT

**Tennis Academy on Lot 404 DP 505513
For Bridesdale Farm Developments Ltd
May 2018**

CONTENTS

- 1.0 INTRODUCTION 3
- 2.0 SCOPE OF WORK 3
- 3.0 DESIGN STANDARDS 3
- 4.0 WASTEWATER 3
 - 4.1 Proposed wastewater disposal 3
- 5.0 STORMWATER 4
 - 5.1 Disposal & Treatment 4
 - 5.2 Objectives 5
- 6.0 WATER RETICULATION 5
 - 6.1 Existing Infrastructure 5
 - 6.2 Proposed services 6
- 7.0 EARTHWORKS 6
 - 7.1 Design standards 6
 - 7.2 Earthworks Methodology 6
 - 7.3 Earthworks Proposed 6

1.0 INTRODUCTION

Clark Fortune McDonald & Associates (CFM) has been engaged by Bridesdale Farm Developments Limited to assess services for a Tennis Academy on land located near the end of Hayes Creek Road, south of the recently completed Bridesdale Farm residential development.

The proposal seeks to develop eight tennis courts, two being covered with sixteen containers to be used as storage, kitchen, teaching space, a viewing platform and toilet/change facilities. It is intended that the academy will have a maximum of 50 people on site at any one time.

The site is legally described as Lot 404 DP 505513. The total site area comprises 16.82 ha and is part of the land contained in CFR 763196.

The site has frontage to a portion of Hayes Creek Road that is located on recreation reserve in the west and marginal strip in the south, which adjoins the Kawarau River.

This report is preliminary and for the purposes of resource consent. Further information and detailed engineering design will be undertaken as development proceeds.

The report considers infrastructure demands based on the proposed recreational activity.

2.0 SCOPE OF WORK

The scope of work includes examination of existing QLDC as-built records, confirmation of capacity of existing services to determine the adequacy of the existing infrastructure, and recommendation of infrastructure servicing options.

3.0 DESIGN STANDARDS

Site development standards include, but are not limited to, the following:

- QLDC Land Development and Subdivision Code of Practice adopted by QLDC on 3rd June 2015.
- NZS4404:2010, Land Development and Subdivision Engineering.
- Drinking-Water Standards for New Zealand 2005.
- NZS PAS 4509:2008, New Zealand Fire Service Fire-fighting Water Supplies Code of Practice.
- Water for Otago, Otago Regional Council regional water plan.
- Document for New Zealand Building Code Surface Water - Clause E1 / Verification Method 1.

4.0 WASTEWATER

4.1 Proposed wastewater disposal

The most feasible option for disposal of wastewater generated by the proposed Tennis Academy is an extension of the existing council reticulated waste water located approximately 350 metres north of the site, within Hayes Creek Road.

It is recommended, based on the anticipated loadings generated from the Tennis Academy, that a 63mm uPVC line (pressure) be installed from the site, along “Hayes Creek Road” and then connected into the existing 63mm pressure main that currently terminates in the location noted above. A suitable storage and pumping system will need to be designed on site as part of further detailed engineering design.

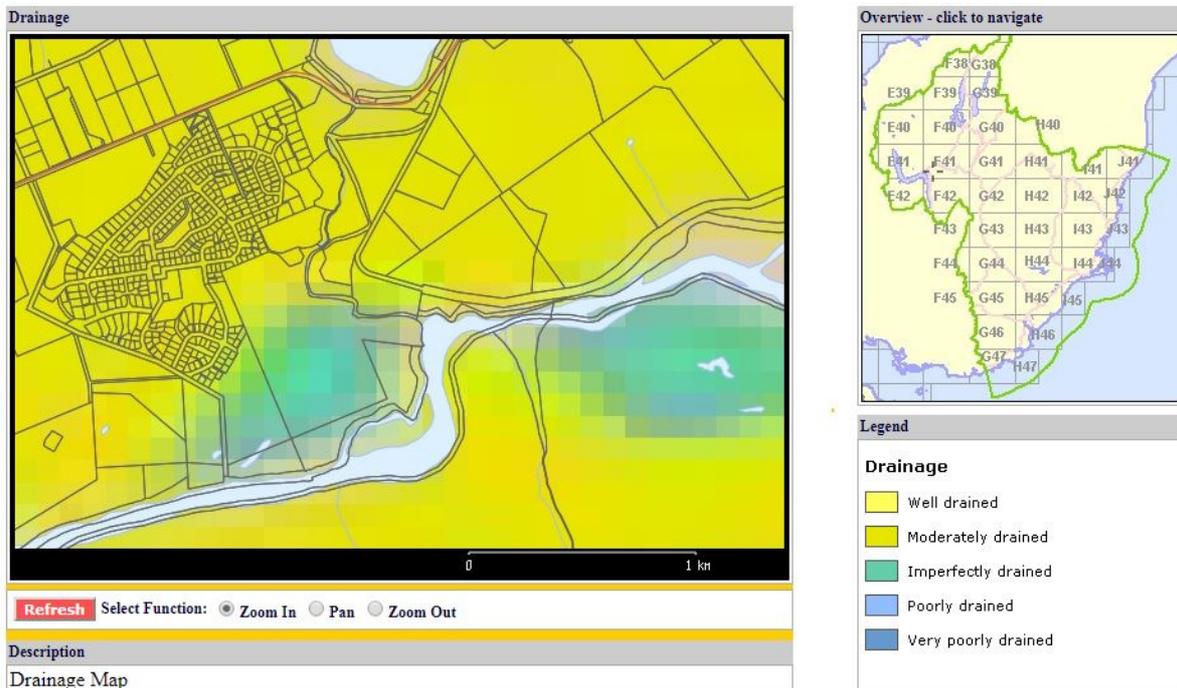
A new easement over the portion of waste water reticulation to be located within the portion of Hayes Creek Road that is located on Recreation Reserve will need to be created to protect these services for the Tennis Academy in perpetuity.

Alternative options, such as on site disposal are not considered appropriate due to the high water table and very low soakage rates found in this area.

It is anticipated that suitable conditions of consent and consent notice conditions could be imposed to ensure adequate level of servicing for the proposed tennis academy once constructed.

5.0 STORMWATER

The development of the site area will increase stormwater runoff and could introduce contaminants into the receiving aquatic environment. The below map indicates that the site is likely to have imperfectly drained to poorly drained soil conditions. The Report completed by Geosolve further confirms this. As a result of this on site soakage has not been considered as a viable option.



5.1 Disposal & Treatment

It is proposed to treat and dispose of any increase in stormwater run-off through either a pipe or a grass swale which will discharge to a retention pond to be located in the north east of the academy. This pond will be approximately 2.5m deep and have a capacity to cope with approximately 300m³ of stormwater runoff. This is the approximate amount of water that would be generated from a one in 20 year rain event with a one hour storm duration,

The location of the retention pond has been chosen as it ensures that the stormwater runoff generated by the proposal will be directed away from the portion of Hayes Creek Road that is located within Recreation Reserve, on the western side of the proposed tennis academy.

Consideration was given to the possibility of draining the stormwater generated by the tennis academy into the existing stormwater detention pond that is located further north on Lot 405 DP 505513, however in order to gravity drain the stormwater into this pond the finished ground level of the Academy would need to be raised by approximately 1.6m. Therefore the effects of the required earthworks necessary to achieve the finished level such as traffic movements for construction traffic, visual effects and possible landscape effects this option was not considered to be the most appropriate.

Secondary overflow paths from the site are predominantly to the south towards the Kawarau River. There are no properties downstream of the site therefore in the event of extreme rainfall and when the primary treatment reaches capacity, no overland flows will cause nuisance to other land owners.

5.2 Objectives

The following objectives should be recognised while assessing stormwater management options for the development site:

- Minimum primary protection for 10% storms (10 year ARI);
- Secondary protection (overland flow paths) for 100 year ARI storms;
- Regulatory Compliance;
- Avoidance of significant increases in downstream peak flows resulting from the increase in developed surface areas;
- Sustainable management of the effects of the proposed development;
- Minimisation of pollution of receiving waterways through the reduction of stormwater contaminants from roadways;
- Erosion protection in the stormwater discharge zone;
- Keeping construction and maintenance costs to a reasonable level.

These objectives have been considered as part of the preliminary design, as outlined below, however some of these objectives will not be able to be fully considered until the detailed engineering stage of the development.

The development contains a large amount of vegetated areas, as well as being surrounded by grass areas. The amount of impervious areas being introduced to the site has been minimised where possible to ensure there are no significant increase in stormwater runoff (including downstream of the proposed development).

It is unlikely that the stormwater discharge zone will cause any significant erosion as it will not be at high velocity and will not be at a steep grade. However it is anticipated that a standard concrete wing wall will be constructed and if necessary stone rip rap can be used to ensure erosion does not occur at the discharge point.

6.0 WATER RETICULATION

6.1 Existing Infrastructure

There is an existing 125mm dia HDPE QLDC water main servicing the lower terrace (allotment gardens) of the Bridesdale development. The closest hydrant is located approximately 260 metres away located a short distance up the hill to the upper terrace on Hayes Creek Road.

6.2 Proposed services

It is proposed to extend the existing water main within Hayes Creek Road, via a 100mm HDPE for approximately 130m to the site boundary and establish a CM2000 water toby, complete with meter in accordance with Council connection policy.

The 100mm pipe will be of a suitable size to cope with the anticipated demand generated by the Tennis Academy, as a pipe with this diameter can service up to 40 residential units, whilst also being large enough to enable hydrants to be installed for fire fighting purposes. This is based on NZS4404:2004 stating that a 100mm pipe is sufficiently large enough to supply up to 40 residential dwellings. Each dwelling is assumed to contain an average of three people, therefore a 100mm pipe can cater for up to 120 people. The tennis academy is expected to have a maximum of 50 people at any one time.

It is also intended to install a new hydrant in the location shown on the attached engineering plan to ensure that there is sufficient firefighting capacity to service the tennis academy. The maintenance of this hydrant will be carried out by the developers should QLDC not accept the vesting of it. The Fire Service (Fire and Emergency NZ) have confirmed they are happy with either approach.

7.0 EARTHWORKS

7.1 Design standards

Site development standards include, but are not limited to, the following:

- NZS4404:2010, Land Development and Subdivision Engineering,
- QLDC Land Development and Subdivision Code of Practice adopted by QLDC on 3rd June 2015.
- The Queenstown Lakes District Council District Plan.
- New Zealand Standard NZS4431:1989.

7.2 Earthworks Methodology

All earthworks will be carried out by a competent Contractor experienced in earthworks and engineered cuts/fills, and in accordance with the recommendations contained within the Geosolve Report dated May 2018.

The earthworks procedures will be supervised by a competent geo professional who will certify on completion the stability of all fills and will certify that the land is suitable for the construction of the tennis academy.

All earthworks procedures will be carried out in accordance with an approved site management plan.

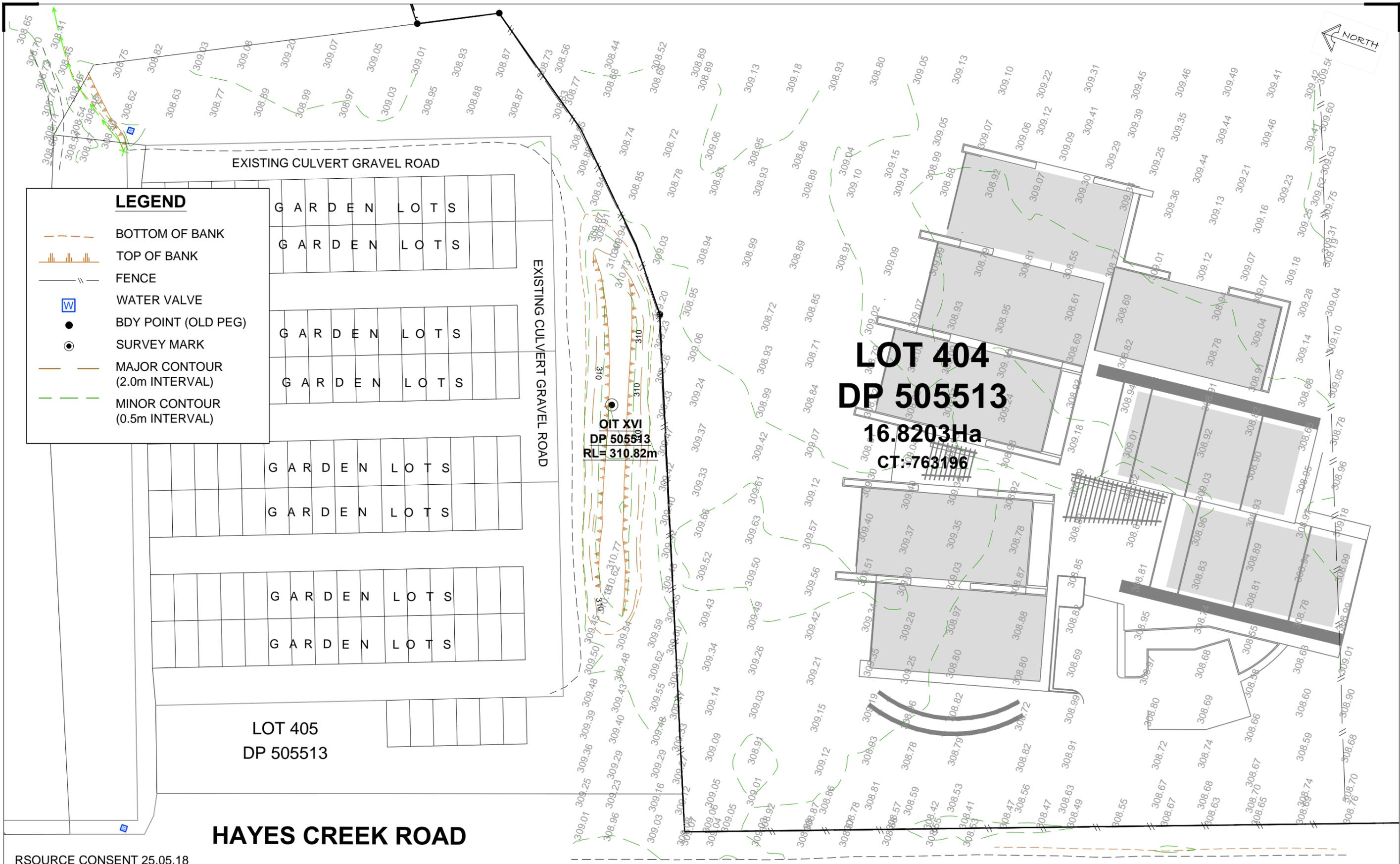
7.3 Earthworks Proposed

It is proposed to raise the current ground level of the site by approximately 300mm to create the finished level of the tennis courts. The finished level for the tennis academy will therefore be 309.3masl.

In accordance with the Geosolve Report, undercut over the site of between 0.6-1.5 metres, which takes into account the uncontrolled fill and topsoil that was found to be present on the site, will also be required. This undercut is to remove unsuitable material that is unable to be appropriately compacted to a level that is in accordance with industry standards (NZS 4431:1989).

Additional material will be required to create the proposed mounding that is to be constructed around the extents of the academy. The mounds are detailed on the Plans prepared for the Winton Tennis Academy and the "Proposed Preliminary Earthworks" Plan prepared by Clark Fortune McDonald.

Earthworks will also be required to excavate and shape the necessary drainage swales (if used) and install the water and foul sewer mains.



RSOURCE CONSENT 25.05.18

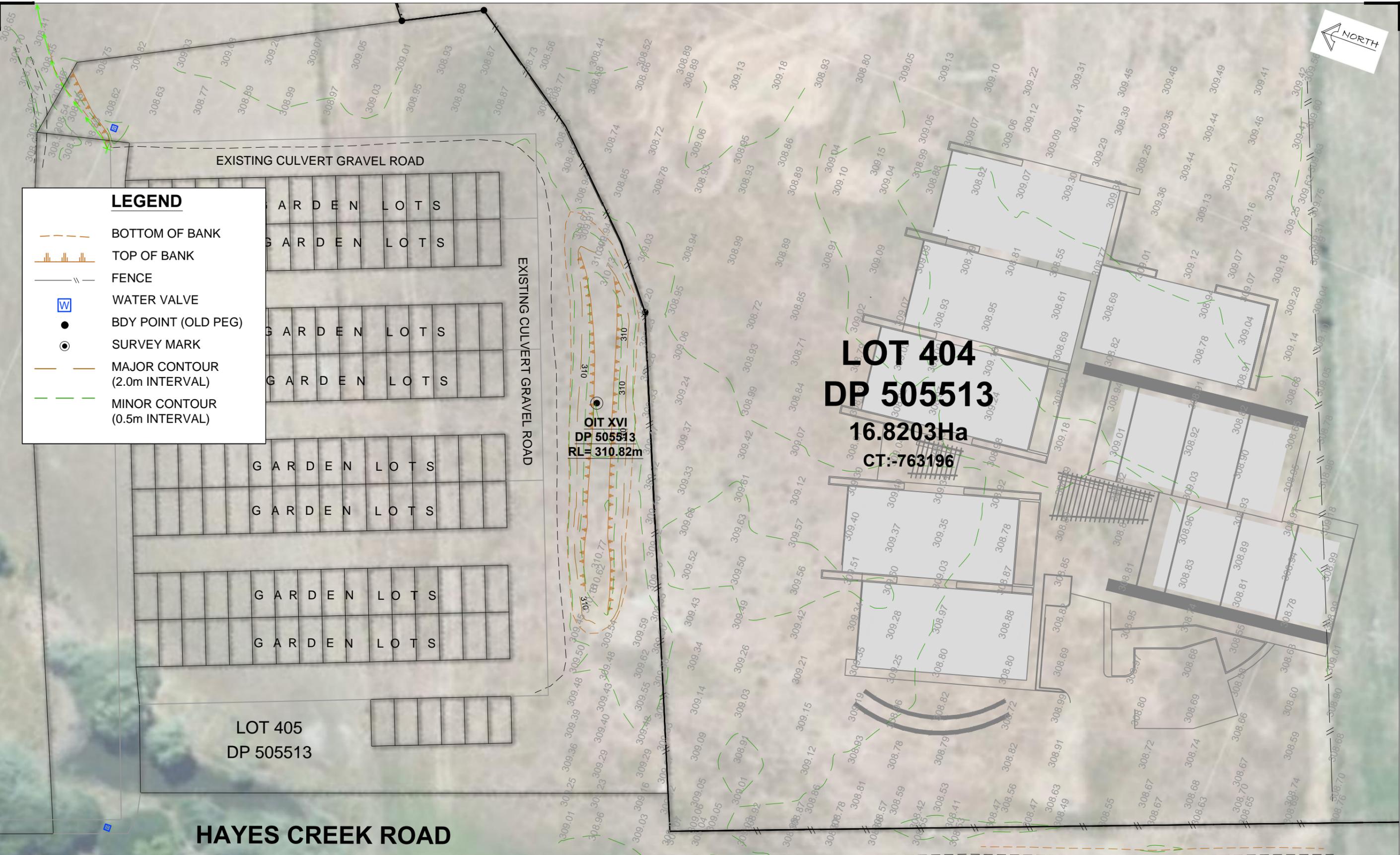

Clark Fortune McDonald & Associates
 Licensed Cadastral Surveyors - Land Development - Planning Consultants
 309 Lower Shotover Road, P.O.Box 553 Queenstown
 Tel. (03)441-6044, Fax (03)442-1066, Email admin@cfma.co.nz
 Shop 2, Otago House, 475 Moray Place, P.O. Box 5960
 Tel. (03)470-1582, Fax (03)470-1583, Email admin@cfma.co.nz

Rev.	Date	Revision Details	By
E	25.05.18	ISSUED FOR RESOURCE CONSENT	HK

**TOPOGRAPHIC SURVEY OF LOT 404 DP 505513
FOR PROPOSED TENNIS CENTRE**

Client	Surveyed	Signed	Date	Job No.	Drawing No.
BRIDESDALE FARMS DEV. LTD.	JJ		07/02/18	13322	01
	Drawn	Signed	Date <td>Scale</td> <td></td>	Scale	
	HK		25.05.18	1:375 @ A1 1:750 @ A3	
	Designed	Signed	Date <td>Datum & Level <td>Rev. </td></td>	Datum & Level <td>Rev. </td>	Rev.
	BFDL		-	NZGD2000 / MSL	E

Notes:
 All dimensions shown are in meters unless shown otherwise.
 Any person using Clark Fortune McDonald drawings and other data accepts the risk of:
 - Using the drawings and other data in electronic form without requesting and checking them for accuracy against the original hard copy versions.
 - Ensuring the information is the most recent issue.
 - Copyright on this drawing is reserved.



LEGEND

- BOTTOM OF BANK
- TOP OF BANK
- FENCE
- WATER VALVE
- BDY POINT (OLD PEG)
- SURVEY MARK
- MAJOR CONTOUR (2.0m INTERVAL)
- MINOR CONTOUR (0.5m INTERVAL)

LOT 404
DP 505513
16.8203Ha
CT:-763196

OIT XVI
 DP 505513
 RL= 310.82m

HAYES CREEK ROAD

LOT 405
DP 505513

RESOURCE CONSENT 25.05.18

Clark Fortune McDonald & Associates
 Licensed Cadastral Surveyors - Land Development - Planning Consultants
 309 Lower Shotover Road, P.O.Box 553 Queenstown
 Tel. (03)441-6044, Fax (03)442-1066, Email admin@cfma.co.nz
 Shop 2, Otago House, 475 Moray Place, P.O. Box 5960
 Tel. (03)470-1582, Fax (03)470-1583, Email admin@cfma.co.nz

Rev.	Date	Revision Details	By
E	25.05.18	ISSUED FOR RESOURCE CONSENT	HK

TOPOGRAPHIC SURVEY OF LOT 404 DP 505513
FOR PROPOSED TENNIS CENTRE
QLDC AERIAL PHOTO OVERLAY

Client	Surveyed	Signed	Date	Job No.	Drawing No.
BRIDESDALE FARMS DEV. LTD.	JJ		07/02/18	13322	01
	Drawn	Signed	Date <td>Scale</td> <td></td>	Scale	
	HK		25.05.18	1:375 @ A1 1:750 @ A3	
	Designed	Signed	Date <td>Datum & Level <td>Rev. </td></td>	Datum & Level <td>Rev. </td>	Rev.
	BFDL		-	NZGD2000 / MSL	E

Notes:
 All dimensions shown are in meters unless shown otherwise.
 Any person using Clark Fortune McDonald drawings and other data accepts the risk of:
 - Using the drawings and other data in electronic form without requesting and checking them for accuracy against the original hard copy versions.
 - Ensuring the information is the most recent issue.
 - Copyright on this drawing is reserved.



EXISTING CULVERT GRAVEL ROAD

LEGEND

-  BOTTOM OF BANK
-  TOP OF BANK
-  FENCE
-  WATER VALVE
-  BDY POINT (OLD PEG)
-  SURVEY MARK
-  MAJOR CONTOUR (2.0m INTERVAL)
-  MINOR CONTOUR (0.5m INTERVAL)

E N L O T S

E N L O T S

E N L O T S

E N L O T S

G A R D E N L O T S

G A R D E N L O T S

G A R D E N L O T S

G A R D E N L O T S

LOT 405
DP 505513

EXISTING CULVERT GRAVEL ROAD

OIT XVI
DP 505513
RL = 310.82m

LOT 404
DP 505513
16.8203Ha
CT: 763196

HAYES CREEK ROAD

RESOURCE CONSENT 25.05.18

 **Clark Fortune McDonald & Associates**
Licensed Cadastral Surveyors - Land Development - Planning Consultants
309 Lower Shotover Road, P.O.Box 553 Queenstown
Tel. (03)441-6044, Fax (03)442-1066, Email admin@cfma.co.nz

Shop 2, Otago House, 475 Moray Place, P.O. Box 5960
Tel. (03)470-1582, Fax (03)470-1583, Email admin@cfma.co.nz

Rev.	Date	Revision Details	By
E	25.05.18	ISSUED FOR RESOURCE CONSENT	HK

**TOPOGRAPHIC SURVEY OF LOT 404 DP 505513
FOR PROPOSED TENNIS CENTRE
PROPOSED PLAN OVERLAY**

Client	Surveyed	Signed	Date	Job No.	Drawing No.
BRIDESDALE FARMS DEV. LTD.	JJ		07/02/18	13322	01
	Drawn	Signed	Date <td>Scale <td></td> </td>	Scale <td></td>	
	HK		25.05.18	1:375 @ A1 1:750 @ A3	
	Designed	Signed	Date <td>Datum & Level <td>Rev. </td></td>	Datum & Level <td>Rev. </td>	Rev.
	BFDL		-	NZGD2000 / MSL	E

Notes:
All dimensions shown are in meters unless shown otherwise.
Any person using Clark Fortune McDonald drawings and other data accepts the risk of:
- Using the drawings and other data in electronic form without requesting and checking them for accuracy against the original hard copy versions.
- Ensuring the information is the most recent issue.
Copyright on this drawing is reserved.

PROPOSED SERVICES

- v — WATER CONNECTION
- FS(P) — SEWER CONNECTION (PRESSURE)
- ← — STORMWATER SWALE
- sv — STORMWATER CONNECTION

- w — EXISTING WATER CONNECTION (125mm HDPE)
- FS(P) — EXISTING SEWER CONNECTION (63mm uPVC)
- sw — EXISTING STORMWATER CONNECTION
- ⊙ — EXISTING STORMWATER MANHOLE

STORMWATER RETENTION POND
 STORAGE VOLUME TO RL 307.6m = 350m³
 BASE RL = 307.0m

LOT 404
DP 505513
 16.8203Ha
 CT:-763196



EXISTING
 CULVERT INVERT
 LEVEL = 308.40m

EXISTING SW
 OUTLET INVERT
 LEVEL = 307.42m

EXISTING SWMH
 INVERT LEVEL =
 308.02m

LOT 405
DP 505513

INSTALL 100MM HDPE WATER LINE & 63MM uPVC WASTE WATER LINE

HAYES CREEK ROAD

OUTLET
 IL = 307.6m

MH
 IL = 307.8m

PROPOSED FFL = 309.30m

MH
 IL = 308.2m

INSTALL HYDRANT

RESOURCE CONSENT 25.05.18

Clark Fortune McDonald & Associates
 Licensed Cadastral Surveyors - Land Development - Planning Consultants
 309 Lower Shotover Road, P.O.Box 553 Queenstown
 Tel. (03)441-6044, Fax (03)442-1066, Email admin@cfma.co.nz
 Shop 2, Otago House, 475 Moray Place, P.O. Box 5960
 Tel. (03)470-1582, Fax (03)470-1583, Email admin@cfma.co.nz

Rev.	Date	Revision Details	By
E	25.05.18	ISSUED FOR RESOURCE CONSENT	HK

TOPOGRAPHIC SURVEY OF LOT 404 DP 505513
FOR PROPOSED TENNIS CENTRE
PROPOSED SERVICE CONNECTIONS

Client	Surveyed	Signed	Date	Job No.	Drawing No.
BRIDESDALE FARMS DEV. LTD.	JJ		07/02/18	13322	01
	HK		25.05.18		Sheet 004
	BFDL				

Date	Scale	Datum & Level	Rev.
25.05.18	1:500 @ A1 1:1000 @ A3	NZGD2000 / MSL	E

Notes:
 All dimensions shown are in meters unless shown otherwise.
 Any person using Clark Fortune McDonald drawings and other data accepts the risk of:
 - Using the drawings and other data in electronic form without requesting and checking them for accuracy against the original hard copy versions.
 - Ensuring the information is the most recent issue.
 - Copyright on this drawing is reserved.

EARTHWORKS

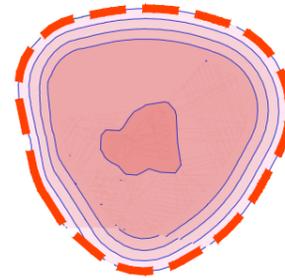
0.0m - 0.5m	0.0m - 0.5m
0.5m - 1.0m	0.5m - 1.0m
1.0m - 1.5m	1.0m - 1.5m
1.5m - 2.0m	1.5m - 2.0m
2.0m - 2.5m	2.0m - 2.5m

UNDERCUT TO A DEPTH OF 0.9m = 19,300 m³ (SOLID MES)
 NOTE: - AVERAGE DEPTH OF 0.9m UNDERCUT HAS BEEN DETERMINED BY TEST PIT SAMPLES ONLY. THIS DEPTH IS SUBJECT TO CHANGE DURING SITE WORKS.

FILL VOLUME = 9,260m³ (ABOVE CURRENT GROUND)
 BACKFILL OF UNDERCUT 0.9m = 19,300 m³
 TOTAL FILL = 28,560m³ (SOLID MEASURE)
 CUT FROM SW POND = 1570m³ (SOLID MEASURE)

MAX FILL DEPTH = 3.0m MAX CUT DEPTH = 2.5m
 AREA OF FILL = 21,600m² AREA OF CUT = 1100m²

STORMWATER RETENTION POND
 EW VOLUME = 1570m³
 DEPTH = 2.5m



LOT 404
DP 505513
 16.8203Ha
 CT:-763196



LOT 405
 DP 505513
HAYES CREEK ROAD

RESOURCE CONSENT 25.05.18

Clark Fortune McDonald & Associates
 Licensed Cadastral Surveyors - Land Development - Planning Consultants
 309 Lower Shotover Road, P.O.Box 553 Queenstown
 Tel. (03)441-6044, Fax (03)442-1066, Email admin@cfma.co.nz
 Shop 2, Otago House, 475 Moray Place, P.O. Box 5960
 Tel. (03)470-1582, Fax (03)470-1583, Email admin@cfma.co.nz

Rev.	Date	Revision Details	By
E	25.05.18	ISSUED FOR RESOURCE CONSENT	HK

TOPOGRAPHIC SURVEY OF LOT 404 DP 505513
FOR PROPOSED TENNIS CENTRE
PROPOSED PRELIMINARY EARTHWORKS

Client	Surveyed	Signed	Date	Job No.	Drawing No.
BRIDESDALE FARMS DEV. LTD.	JJ		07/02/18	13322	01
	Drawn	Signed	Date <td>Scale <td></td> </td>	Scale <td></td>	
	HK		25.05.18	1:500 @ A1 1:1000 @ A3	
	Designed	Signed	Date <td>Datum & Level <td>Rev. </td></td>	Datum & Level <td>Rev. </td>	Rev.
	BFDL		-	NZGD2000 / MSL	E

Notes:
 All dimensions shown are in meters unless shown otherwise.
 Any person using Clark Fortune McDonald drawings and other data accepts the risk of:
 - Using the drawings and other data in electronic form without requesting and checking them for accuracy against the original hard copy versions.
 - Ensuring the information is the most recent issue.
 - Copyright on this drawing is reserved.